

ability ascribe the greater prominence now given in treatises of Physical Geography and Geology to the geological aspects of man's position on the globe. A new edition shows that the efforts of the author have not been wholly unappreciated here by that general reading public, not of professed *savants*, but of educated, observing men, to whom they were addressed. He must be gratified also to find that as his materials were in large measure derived from the observations of foreign writers, his work has met with a special measure of notice and approval on the Continent. It is frequently cited by recent French and German authors in Physical Geography and Geology, and a special Italian edition of it has lately been published under the author's supervision.

Of a book which has now established its position it is not necessary to say anything by way of criticism. This new edition has been somewhat enlarged, but the same division of subjects is retained. The author, who, besides being familiar with the characteristics of large tracts of his own country, the United States, has travelled extensively in Europe, brings his work abreast of the most recent discoveries and conjectures. The extent of his reading, remarkable enough in the first edition, is evinced again in this new issue. He seems to have come across the most out-of-the-way blue-book of the most out-of-the-way kingdom, and it has yielded to him some apposite illustration or suggestive fact. And even though we may be disposed to admire more the wonderful industry of research than the judgment in the selection of evidence, we cannot read even the most doubtful bits of testimony cited and commented upon without being made to think about what we may perhaps have noticed ourselves but never really reflected upon before. And there could hardly be a greater merit in a book than this. As to the change of title in this new edition, we are inclined to think it a mistake, for two reasons. In the first place, it is not in itself so good a title as the first; and in the second, the changes in the present edition are not sufficient to warrant the dropping of the name by which the book is generally known. This, however, is a small matter, and will not, we hope, damage the progress of a treatise which certainly ought to be one of the standard works of reference in the library of every well-educated Englishman.

#### BRINKLEY'S ASTRONOMY

*Brinkley's Astronomy.* Revised and partly re-written, with additional chapters, by John William Stubbs, D.D., Fellow and Tutor of Trinity College, and Francis Brünnow, Ph.D., late Astronomer Royal of Ireland, and Professor of Astronomy in the University of Dublin. (London: Longmans and Co., 1874.)

DR. BRINKLEY'S treatise on elementary astronomy, of which this is a new and revised edition, has been for many years one of the recognised text-books provided for the use of Trinity College, Dublin. We believe, however, that it is a work comparatively little known out of Ireland, and probably many English astronomers were not aware of its existence till its reappearance, in a new dress, under the able guidance and direction of Dr. Stubbs and Dr. Brünnow, by whom the present edition is revised, enlarged, and partly re-written. Its popularity as

a text-book will doubtless be no longer confined to the sister island; for this treatise, although elementary in its character, contains such clear and concise explanations of some of the principal problems in astronomy, that its intrinsic merit alone will probably find for it a place among the choice volumes of every astronomical student, and also on the shelves of every astronomical library. We do not say that this "Astronomy" is all that can be desired, nor will it obviate the necessity for the employment of a more elaborate work on practical astronomy where extreme accuracy is required in the reduction of observations; but it does on the whole explain the different problems in a clear and easy manner and in popular language, without sacrificing those details which are necessary for a proper elucidation of the different problems. We should, however, have been glad if a more detailed account had been given of some of the subjects treated upon, especially in the chapter describing the instruments usually employed in making astronomical observations. The methods of determining the instrumental adjustments are sufficiently explained, but it would be of great service to amateur astronomers if examples had been given of the complete reduction of both meridional and equatorial observations, a kind of information rarely to be found in detail in astronomical treatises.

The name of Dr. Brinkley involuntarily carries us back so far into the history of modern astronomy that a doubt existed in our mind, before opening the book, that an astronomical treatise originally prepared so many years ago, even by so distinguished an astronomer, must necessarily retain much of an antiquated character, either in arrangement or material. Thanks, however, to the great practical knowledge of Dr. Brinkley, and to the editorial labours of Dr. Stubbs and Dr. Brünnow, we find the science is represented as accurately as if the work had been published now for the first time. In the days of Dr. Brinkley, directors of observatories did not consider it their duty to reduce their observations with that completeness which we are now accustomed to see. It was not till the present Astronomer Royal, Sir George Airy, was appointed to the direction of the Royal Observatory that the numerous observations of the moon and planets made at Greenwich since 1750 were reduced upon one uniform system, and of sufficient accuracy to be made available for the correction of the elements of the lunar and planetary orbits. Under these circumstances, many of the principal astronomical constants were not sufficiently determined in the early part of the present century, especially of those relating to observing astronomy, to admit of the production of a practical handbook in so satisfactory a manner as at the present day; but in all that was essential for the proper comprehension of the general planetary and lunar motions, no one had greater qualifications for such a task than the learned Bishop of Cloyne, who had himself, in addition to other researches on refraction and parallax, investigated the value of the constant of aberration from observations made with the 8-ft. circle at the observatory of Trinity College.

This introductory treatise is founded on a series of annual lectures on astronomy delivered by Dr. Brinkley before the undergraduates of Trinity College during his occupation of the Andrews Chair of Astronomy in the University of Dublin. At the request of the College

Board these lectures were afterwards published, and they have since formed an important portion of the course of study required for the College examinations. For some time it was universally felt that the book was not in keeping with the advanced state of astronomical science, and that a new and revised edition was necessary. For this purpose, the authorities of Trinity College, who naturally have a traditional respect for this treatise, were fortunate in securing so accomplished an editor as Dr. Stubbs, and the co-operation of so distinguished an astronomer as Dr. Brünnow.

Seekers after the romance and history of astronomy will find in this volume few facts recorded in this interesting branch of the science, which the editors have apparently rightly considered as forming no part of a college text-book, for "the student who has made himself so well acquainted with astronomy as to find its history interesting will easily procure for himself, from a variety of authors, all the information he can desire." There is also a very limited amount of description of the physical aspects of the larger planets. We rather regret this omission, although there may be reason for doing so, for we believe that the book would have been more generally attractive and useful had some of the results of the numerous modern observations of the physical features of Mars, Jupiter, and Saturn been given. This treatise contains, however, what is far more valuable in a text-book, and which is often slurred over in many popular astronomical works of much higher pretensions, clear and concise explanations, accompanied in many instances with the formulæ of reduction, of various astronomical subjects. Among them we may name the theories of refraction and parallax, the phenomena depending on a change of position on the earth's surface, the motions of the moon and planets in their orbits, eclipses of the sun and moon, the application of astronomy to navigation and geography, the figure of the earth, the masses of the sun and planets, &c. A very fair description of the construction and use of the transit instrument, mural circle, and equatorial is also given, sufficient in fact to enable a non-practised but intelligent observer to understand easily the necessary adjustments required in the use of these instruments. There is an omission, however, though we could scarcely expect to find it inserted, as the method is only adopted in a few of the principal observatories, but a notice of which we are inclined to think would have been acceptable to many, and would doubtless increase the value of the section on astronomical instruments. We refer to the method of automatic registration of transits on a chronograph, instead of recording them by the ordinary or "eye and ear" method. It is true that the usual manner of making a transit is sufficiently explained, but as the chronographic registration is now frequently adopted in the determination of the differences of terrestrial longitudes, as well as in the ordinary registration of transits, we shall always be glad to see a description of the chronograph in every treatise on practical astronomy.

Besides considerable alterations in the arrangement of the subjects and additions to the text made by Dr. Stubbs, Dr. Brünnow has contributed new chapters on the physical constitution of the sun and heavenly bodies, on discoveries made by means of the spectroscope, on the proper motions of the fixed stars, and on the general

advance of stellar astronomy. We need not remark more on these chapters than that the great astronomical reputation of Dr. Brünnow is a sufficient guarantee of their accuracy, and to observe that the principal results of the recent researches are given in a concise form, which makes these chapters most interesting as well as valuable reading.

We have hitherto given to this excellent treatise an almost unqualified approval, but there are one or two points of no great moment which we should like to see corrected in a future edition. Nothing offends the eye of an astronomer more than to see in an astronomical text-book errors in the orthography of well-known proper names. We have detected a few of such errors which ought to have attracted the attention of the editors if not of the printer. "Flamstead" for *Flamsteed* might reasonably be passed over in silence; but when we see "Faumalhaut" printed for *Fomalhaut*, "Fourcault," more than once, for *Foucault*, "Leomis" for *Loomis*, "Maskeline," more than once, for *Maskelyne*, we cannot avoid feeling a pang of regret that in an educational work on the science such inaccuracies should have been allowed to pass. Again, it is unfortunate that greater care was not taken to correct the distances and magnitudes of the members of the solar system, depending upon the recent alteration of the value of the solar parallax, especially as the new value of the sun's distance in miles is frequently given. The old value in miles for the velocity of light per second, 192,000, might also have been corrected for the same reason. On page 152, the value of the solar parallax determined from Foucault's experiment is  $8''.86$ , not  $8''.942$ , this latter value being sensibly the same as that determined finally by Mr. Stone from a comparison of the Greenwich observations of Mars at the opposition in 1862, with the corresponding observations made by Sir Thomas Maclear at the Cape and by Mr. Ellery at Williamstown, Australia.

Notwithstanding these few slight drawbacks, we do not hesitate to recommend this most excellent treatise, which is moderate in price, to all who are interested in astronomical observations and in the progress of astronomy.

#### OUR BOOK SHELF

*A Peep at Mexico.* By John Lewis Geiger, F.R.G.S. (London: Trübner and Co., 1874.)

MR. GEIGER'S book is chiefly devoted to a description of the not well known country westward of the town of Mexico. The route of his journey was from Manzanillo, on the coast of the Pacific, *viâ* Colima, Zacoalco, Guadalajara, Guanajuato, and Querétaro, to the capital.

The book gives but a "peep" at Mexico, but it is a very agreeable one; for, not entirely relying on his pen to describe what he saw, the author photographed *en route*, and forty-five views illustrate his book. Although the people, their habitations, and their ways, are the principal topics on which Mr. Geiger writes, yet here and there he gives glimpses of the natural history of the country. For example, the first part of his journey from Manzanillo was along the Laguna de Cuyutlan, which runs parallel with the shore, separated from the ocean by only a narrow strip of land. "It is almost completely enclosed by mangrove jungle, which overruns the banks and creates numerous islets by its growth where the water is shallowest. . . . There is no